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opium, and not unlike some of the bad varieties of Egyptian; it contains codeine, and a larger proportion than usual of meconic acid. 20 oz. avoirdupois of the dry opium contain

384 grs. of pure morphia.

220 grs. of narcotine.

Mr. Hennell, in his examination (Vol. XLIII., p. lvi. of the Society's Transactions) gave for 20 oz. $662\frac{1}{2}$ grs.,—a quantity nearly equal to the narcotine and morphia united.

I send you samples of the products.

I am, Sir, &c. &c.

A. AIKIN, Esq.

T. N. R. MORSON.

Secretary, &c. &c.

No. III.

POLISHING POWDER.

The Thanks of the Society were voted to Mr. A. Ross, 15, St. John's Square, Clerkenwell, for the following description of his method of preparing Polishing Powder for the use of Opticians, &c.

SIR,

18th May, 1833.

HAVING in the course of my practice had considerable difficulty in procuring oxide of iron fit for polishing glass and steel with sufficient rapidity, and without hazard of scratching, I was induced to try to prepare it myself; and I now inform you, that I have completely succeeded in

preparing an impalpable powder with the requisite hardness. I beg the favour of you to communicate this to the Society, and if they should think it of sufficient importance to communicate to the public through the medium of their *Transactions*, I shall be happy to impart the process for that purpose.

I am, Sir, &c. &c.

A. AIKIN, Esq.

A. Ross.

Secretary, &c. &c.

Oxide of iron is extensively used as a polishing powder, under the name of colcothar of vitriol, crocus, tripel, and rouge, and is supplied from the residuum of some chemical operation; but from this source of supply there is a great quantity of extraneous matter wholly unfit for polishing; and owing to the nearly equal specific gravity of its component parts, the ordinary operation of washing over does not separate the effective from the detrimental. These circumstances induced me to prepare it; and the following is the mode of preparation I ultimately adopted.

Dissolve crystals of sulphate of iron in water; filter the solution, to separate some particles of silex which are generally present, and sometimes are abundant; then precipitate from this filtered solution the protoxide of iron by the addition of a saturated solution of soda, which must also be filtered. This gray oxide is to be repeatedly washed and then dried; put it in this state into a crucible, and very gradually raise it to a dull red heat; then pour it into a clean metal or earthen dish, and while cooling it will absorb oxygen from the atmosphere, and acquire a beautiful dark red colour. In this state it is fit for polishing the softer metals, as silver and gold,

but will scarcely make any impression on hardened steel or glass. For these latter purposes, I discovered that it is the black oxide that effected the polish (and this gives to the red oxide a purple hue, which is used as the criterion of its quality in ordinary); therefore, for polishing the harder materials, the oxide must be heated to a bright red, and kept in that state until a sufficient quantity of it is converted into black oxide to give the mass a deep purple hue when exposed to the atmosphere. I have converted the whole into black oxide; but this is liable to scratch, and does not work so pleasantly as when mixed with the softer material. The powder must now be levigated with a soft wrought-iron spatula upon a soft iron slab, and afterwards washed in a very weak solution of gum-arabic, as recommended by Dr. Green in his paper on Specula.* The oxide prepared in this manner is almost impalpable, and free from all extraneous matter, and has the requisite quality in an eminent degree for polishing steel, glass, the softer gems, &c. &c.

A. Ross.

Part of the sample sent by Mr. Ross to the Society was put into the hands of Mr. C. Varley and of Mr. Powell for trial; the result will be found in the following letters:—

SIR,
1, *Charles Street, Clarendon Square,*
February 1st, 1834.

I have tried Mr. Ross's preparation of iron as a powder for polishing lenses. I used new tools, free from all other polishing stuff, and mixed the powder with only enough water for use; therefore there was no depth for

* See Mechanics, No. 17, in the present volume.

the coarse particles to separate from the fine. I dipped the small lenses in, to take up the stuff, and it felt so harsh and gritty, that the obvious conclusion would be that it must scratch; but, on the contrary, the two lenses that I have polished were not in the least scratched during the process, but were speedily brought to a most satisfactory brilliant polish;* the harsh feel is therefore in its favour, and, I conclude, arises from a slight aggregation of the particles, which immediately gives way before the lens. Common polishing-powder I suspect to be a mixture of particles, some only of which are capable of cutting or polishing, and therefore the use of it causes a great waste of time. My impression is, that Mr. Ross's preparation is all polishing stuff, free from any thing else, and consequently quite good.

The same materials have been used long ago to prepare the powder; but the process appeared to me so crude, that I never thought of trying it. Mr. Ross appears to me to be the first that has devised a method of preparing it quite good, with the least waste.

It would still shorten the process, or throw some light on the state of iron that is best for polishing, if chemists would try whether iron can be precipitated at once in the same state equally fit for polishing.

I am, Sir, &c. &c.

A. AIKIN, *Esq.*

CORNELIUS VARLEY.

Secretary, &c. &c.

* There was a scratch left in one from the grinding; it probably arose from a particle of emery that had only entered during the last rub. When beginning to polish it was seen like holes in the glass; these were a good gage of the sharpness of the powder, for they were speedily polished out. We always know a scratch before polishing from one which occurs during that process.

24 Clarendon Street, Somers Town,

SIR,

Feb. 14th, 1834.

IN answer to your note of the 1st, respecting Mr. Ross's polishing-powder, I beg leave to say that I have found it cut much keener, and produce as fine a polish as putty powder, which will be a great advantage, as it is not so liable to spoil the figure of lenses, &c. &c.

I am, Sir, &c. &c.

A. AIKIN, Esq.

HUGH POWELL.

Secretary, &c. &c.

No. IV.

ELECTRICAL MACHINE.

The SILVER ISIS MEDAL was voted to Mr. ROGER BROWN, of Sheffield, for his Heater for an Electrical Machine, a Model of which has been placed in the Society's Repository.

PERSONS having occasion to use an electrical machine are often subjected to disappointment and great loss of time from the imperfect action of the machine, owing to the usually moist state of the air in England. Hence it is customary to place the machine before a brisk fire, in order that it may be thoroughly warmed and dried before proceeding to make use of it. Much time is thus consumed which might be better employed; and the risk of breaking the glass by a partial or too sudden an application of heat, is not inconsiderable. During its use, also,